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**Filed** : March 16, 2001

### **REMARKS**

In the Office Action mailed October 4, 2002, the Examiner reviewed Claims 1-13, 21-30, 40-54, and 60-70, which were elected for prosecution by the Applicants as part of the restriction requirement as laid forth in the Office Action. In the Office Action, the Examiner objected to the drawings, the specification, and the claims. The Examiner also rejected Claims 1-13, 21-30, 40-54, and 60-70 based on various references under 35 U.S.C. § 103. As set forth below, Applicants have amended the Abstract, specification, and claims to comply with the Examiner's requests and to place the application in a state of allowability. The amendments and the Applicants' comments are set forth below.

Also attached is a Joint Declaration by inventor Keith Jones and inventor William Jones ("Declaration") regarding the factors that support a finding non-obviousness of the combination claimed and instances of teaching away in the art. It is submitted that both Keith Jones and William Jones are of ordinary or greater skill in the art and their declaration is offered as evidence in support of statements made herein.

### **Drawings**

The Examiner objected to the drawings in several instances as containing reference numbers not mentioned in the text. Applicants have amended several paragraphs of the specification to include the reference numbers in question, namely, "514B," "520A," "520B," "520C," "524," and "650."

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**Abstract**

The Examiner objected to the Abstract as exceeding 150 words. Applicants have submitted herewith a replacement Abstract that complies with the word limits.

**Specification**

The Examiner objected to the “communication interface” being listed twice at page 13, lines 16-18. Applicants have amended the paragraph appearing at page 13, line 8 to page 14, line 2 to correct this defect and to bring the text into agreement with Figure 1.

The Examiner objected to the use of a singular verb at page 14, line 5. Applicants have amended the paragraph appearing at page 14, lines 3-8 to correct this defect and to bring the text into agreement with Figure 2A.

The Examiner objected to the mislabeling of element 408 in lines 14 and 20 of page 23. Applicants have amended the paragraph appearing at page 23, line 9 to page 24, line 2 to bring the text into agreement with Figure 4.

The Examiner objected to the passage at page 25, line 17-19 as being confusing. Applicants submit that the passage is technically correct as presented and would be understood by one of ordinary skill in the art. The Examiner’s proposed revision would change the meaning of the passage, and hence it is requested that the Examiner reconsider his objection to this passage.

The Examiner objected to the paragraph appearing at page 30, line 19 to page 31, line 6 and the paragraph appearing at page 44, lines 6-12 for failing to underline the titles of texts. Applicants have amended these paragraphs to correct this defect.

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The Examiner objected to the text at page 44, line 8 for incorrectly labeling the “prediction filter.” Applicants have amended the paragraph appearing at page 44, lines 6-12 to include the correct label.

The Examiner objected to the text at page 46, line 12 for incorrectly labeling the “correlation step.” Applicants have amended the paragraph appearing at page 45, line 18 to page 46, line 14 to include the correct label.

The Examiner objected to the text at page 48, line 1 for incorrect placement of a comma. Applicants have amended the paragraph appearing at page 47, line 18 to page 48, line 10 to correct this defect.

The Examiner objected to the text at page 53, line 18 for transposing “T1” with “T2.” Applicants have amended the paragraph appearing at page 53, line 15 to page 54, line 3 to correct this defect.

#### **Applicants’ Comments**

Applicants have amended Claims 1, 7, 21, 40, 45, 50, and 65 to expressly incorporate the limitation that the method is performed within or by a communication device, such as for example, a modem, or that the system comprises a communication device or modem. Claim 26 has been amended to require that the test signal comprise a signal that has autocorrelation properties. Claim 60 has been amended to require means for cross correlating. Applicants submit that the claims as amended overcome the prior art for the reasons provided below. Applicants have provided a Joint Declaration of Keith Jones and William Jones, both of whom are of at least ordinary skill in the art, regarding their interpretation of the teachings of the

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primary cited references and their characterization of the claims, the inventive process, and the non-obviousness of the claimed invention to one of ordinary skill in the art.

Applicants note and support with the Declaration that there existed two paths or schools of thought in the prior art when dealing with line probing. The art cited by the Examiner reflects these two conventional paths, namely, 1) non-complex time domain reflectometry (TDR) which may occur, due to its simplicity, in a modem, and 2) complex sequence signal TDR in stand alone test equipment. Based on the comments of the inventors in the Joint Declaration, these two paths are the accepted and conventional wisdom in the art.

In contrast, the claimed invention diverges from these conventional paths by combining the complex sequence signal TDR with convolution into a communication device. This is achieved utilizing components and functionality presently existing in communication devices without the need to add complex processors and signal generators. None of the cited references discloses a communication device having time domain reflectometry capability as claimed in the present application, nor would such a system or method be obvious to one of ordinary skill in the art based on a reading of the cited references.

Applicants note that the fact, as supported by the Joint Declaration, that the inventors proceeded contrary to the accepted wisdom in the art is an indication of non-obviousness. As specified in MPEP section 2145(X)(D)(3), proceeding contrary to accepted wisdom is evidence of nonobviousness.

As cited in section 706.02(j) of the MPEP, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The teaching or

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suggestion to make the claimed combination must both be found in the prior art and not be based on the applicant's disclosure. Applicants submit that the prior art does not contain such suggestions, but instead teaches away from such a combination. The fact that two or more references can contain individual parts of a claim does not make the claimed combination obvious. There must be some suggestion to combine.

The Examiner utilized the Liggett reference as a primary reference in the rejections of independent Claims 1, 7, 21, 26, 40, 45, 50, 60, and 65. Liggett is directed, as clearly shown in Figures 3 and 4, to a stand alone piece of test equipment. Moreover, no suggestion is made within the Liggett reference to implement the disclosed system into a communication device. As offered in the Declaration, the Liggett reference teaches away from the present invention by teaching complex multi-processor based sequence signal TDR in a stand alone piece of test equipment. This path is a known line of conventional and accepted wisdom in the prior art.

Likewise, the Hwa reference teaches a stand alone test equipment for performing complex sequence signal TDR. As supported by the Declaration, it provides no suggestion to combine complex sequence signal TDR with a communication device.

The Examiner cites the Westrom reference in the rejection of independent Claims 1, 7, 21, 26, 40, 45, 60, and 65. The Westrom reference is directed to testing high-voltage underground power cables utilizing a high power pulse. The claims as amended are directed to a communication device capable of achieving data communication. This claim amendment is supported by Figures 1, 2, 4 and 10 and numerous passages of the text, such as at page 13, lines 14-16 and page 39, lines 10-12. Hence, one of ordinary skill in the art would be a designer of high-speed communication devices. As such, the Applicants assert that the Westrom reference is

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improperly cited by the Examiner, since one of ordinary skill in the art for high-speed data communication devices would not be aware of or familiar with high-voltage underground power line technology. This position is supported by the Declaration that is submitted herewith.

As further supported by the Declaration, the Westrom reference not only does not suggest the claimed combination, but in fact teaches away from the claimed combination by suggesting use of a high power pulse generated by the high power pulse generator 28 shown in Figure 1. Use of a high power pulse is teaching directly opposite to the direction of the claimed invention, which utilizes a sequence of lower power pulses. Use of a high power pulse can significantly disrupt operation of adjacent lines and is limited in accuracy. Support for this statement is provided in the Declaration.

The Examiner also cited the Belge reference (US 2002/0114383) against independent claims 7, 40, and 65. As supported by the Declaration, the Belge reference teaches a pulse type system as evidenced by paragraph 76, ("reflection which is observed as a pulse . . ."). This very same paragraph expressly teaches away from the claimed invention by admitting that "analyzing the time domain waveform of the echo signal becomes very complicated. For this reason, a model based approach can be used for the TDR estimations." This passage expressly admits that because of the complexities of TDR processing, a model based approach must be relied upon. Hence, this reference re-enforces the statements by the inventors in the Declaration that one accepted and conventional school of thought is to perform less complex pulse type TDR in a communication device and that processing by a communication device is limited to non-convolutional, non-sequence type processing due to the complexity of such processing. This interpretation is supported in evidence by the Declaration by the inventors, both of whom are of

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at least ordinary skill in the art. Applicants note that it is un-likely that either the Examiner or the Applicants' attorney qualifies as one of ordinary skill in the art. Hence, statements of the Declaration must be given substantial weight.

The Declaration by inventors Keith Jones and William Jones also refutes the use of the Broding reference. Broding is directed to a method and apparatus for determining the length of a logging cable introduced into a bore hole, i.e., well hole. This reference is in no way related to TDR on a high speed communication channel. As supported by the Declaration, when those of skill in the art of high speed communication systems look to art, they do not look to references directed to either logging cable or oil or gas wells (see column 1, lines 5-17). Hence, use of the reference is improper.

Applicants have also amended Claims 26 and 60 to include features that are not contained within the cited art. Claim 26 now requires the sequence signal to have cross-correlation properties. Claim 60 now requires that the means for correlating comprise means for cross correlating. Applicants submit that these features are not taught or suggested by the cited art, and hence are allowable.

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### CONCLUSION

Applicants request that the Examiner make the proposed amendments to the specification and claims. Applicants assert that Claims 1-13, 21-30, 40-54, and 60-70 as amended are in a condition for allowance. The Examiner is encouraged to contact the undersigned attorney if there are any matters which may be resolved by telephone.

Respectfully submitted,

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